

The dose equivalent limits for members of the public are a factor of **ten** below those for radiation workers.

9.2.2 Radiation monitoring instruments

With the growing use of ionizing radiations, considerable amount of attention has been given to the 'safe' radiation exposure of wide-cross section of population. In particular, personnel working with radiation installations require continuous monitoring of the dose received and recording of the cumulative dose throughout the individual's life time. This is more commonly known as 'personnel monitoring'.

i) Pocket dosimeters

Pocket dosimeters are of fountain pen size and can conveniently be kept in the pocket. Basically, the dosimeter is an ionisation chamber which is charged to a suitable voltage obtained from a separate charger (150-200 V) (Figure 9.2). In self-reading type pocket dosimeter, the chamber is coupled to a built-in electrometer (quartz-fibre electrometer) and a microscope to view the electrometer having a reticle calibrated in terms of Roentgen. In non-self reading type dosimeter, the measurements are made with a reading device which has a built-in charger. The dosimeter is initially charged so that the deflection of the quartz fibre is at zero on the scale when viewed in the charger or in charger-reader. The dosimeter is then ready for use. After use, the self-reading type is viewed against light and the non-self reading type is fitted back to the charger-reader and viewed for the dose measurement.

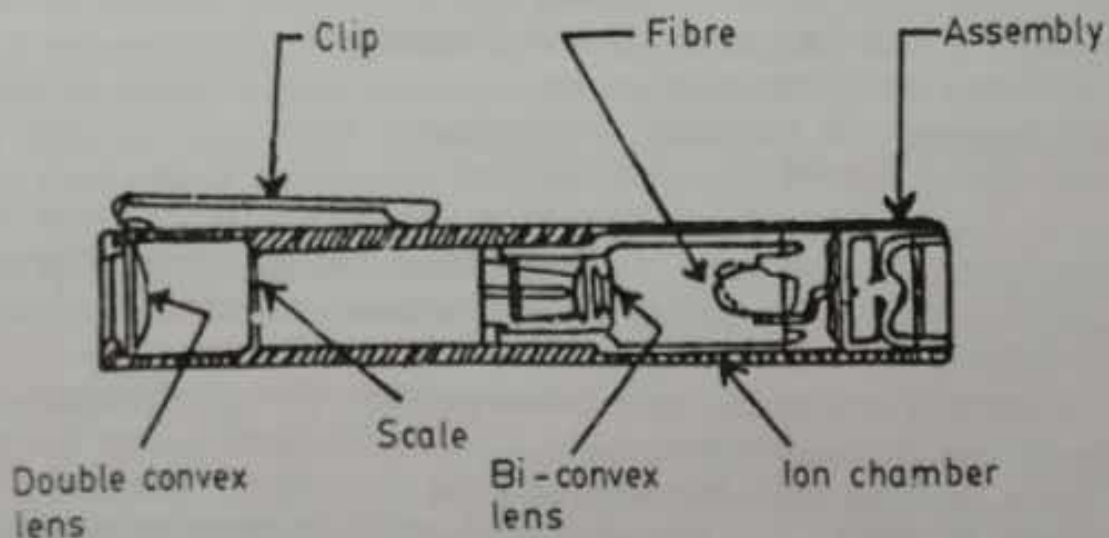


Fig.9.2. Cross-Sectional view of a typical Quartz-Fibre pocket dosimeter

II) Pocket type radiation alarm

Radiation alarm is used extensively by radiation workers carrying out job in and around radiation installations. The instrument gives a visual as well as an aural signal to alert the personnel about the exposure rate while carrying out the work. Radiation on GM counter produces an avalanche current and charges the capacitor to a voltage at which the neon lamp fires and gives a signal to the audio stage (Figure 9.3). Preset radiation levels can be adjusted. The GM counter used in this type of instrument is generally having long plateau, less working voltage, good linearity between pulses/second and R/hr and flat response over a long energy spectrum.

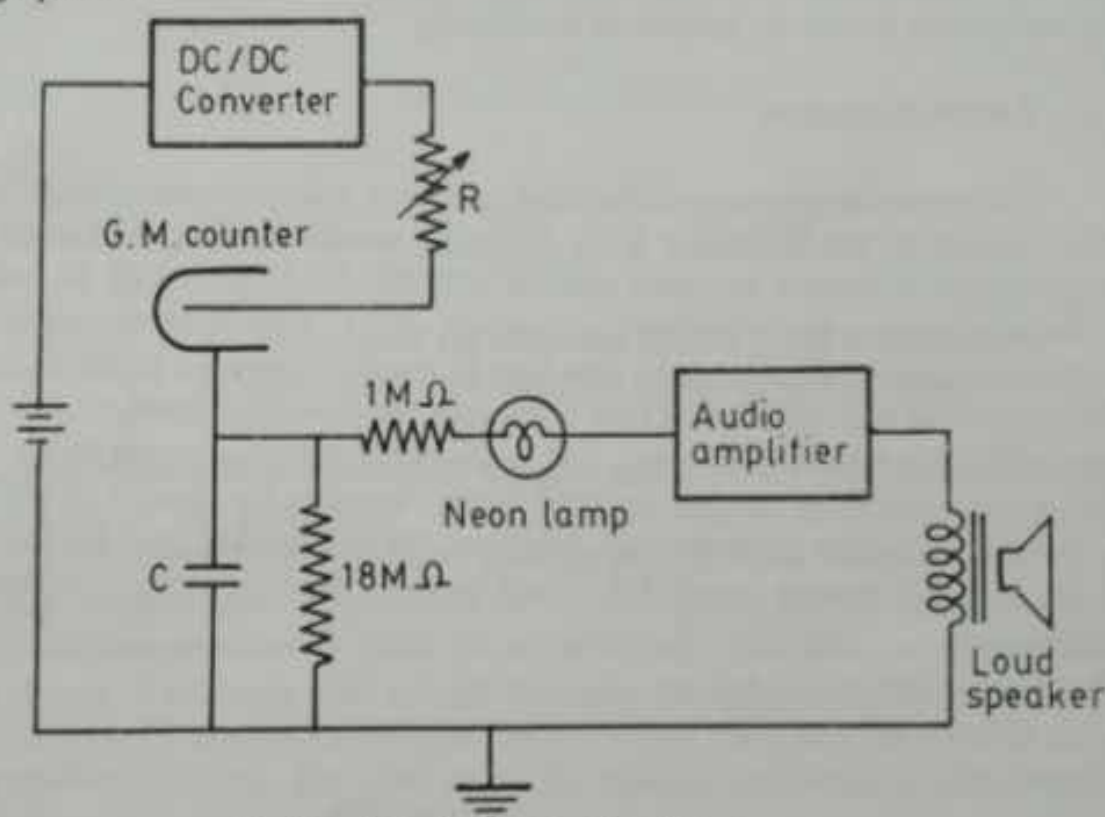


Fig.9.3. A typical radiation alarm

i) Film dosimeter

Film dosimeters are extensively used for cumulative dose measurement in routine personnel monitoring. The film badge is a simple plastic (with stainless steel lining) holder made to hold a conventional dental film with a number of suitable filters (*viz.* plastic, copper 1, copper 2, lead, cadmium etc.) and an open window. The filters are selected to make the sensitivity of the film independent of radiation energies. The paper wrapped film (e.g. Eastman Kodak type II - double coated emulsion) is placed inside the badge. The radiations passing through the filter cause formation of latent image in the film which after due processing forms blackening. The amount of blackening is measured in terms of optical density by a densitometer. Computation of densities under different filters gives the amount